SATA 12.7mm Height

BD-ROM, DVD/CD WRITER

BDC-TD03RS

PRODUCT SPECIFICATION

< JB-U0239>

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PIONEER DIGITAL DESIGN AND MANUFACTURING CORPORATION

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CONTENTS

1. Blank Page **3**
2. Features **4**
3. Name of Parts / Function / Setting **5**
3.1. Front 5
3.2. Rear 6
4. Power Supply **7**
4.1. Input Voltage 7
4.2. Current and Power Consumption 7
5. Installation **8**
5.1. Mounting Direction 8
5.2. Installation Conditions 9
6. Environmental Conditions **11**
6.1. Temperature and Humidity 11
6.2. Vibration 11
6.3. Shock 12
6.4. ESD (Electro Static Discharge Susceptibility) 12
6.5. Altitude 12
7. Specifications **13**
7.1. Disc Format 13
7.2. Read Speed 14
7.3. Write Speed 15
7.4. Applicable Write Format 16
7.5. Disc Size Diameter 16
7.6. Sustained Data Transfer Rate (Theoretical value) 17
7.7. Buffer Memory Size 17
7.8. Access Time / Seek Time 18
7.9. Initializing Time / Stating Time / Stop Time 18
7.10. Acoustic 19
8. Dimensions / Weight / Eject Distance / Packing **20**
8.1. Dimensions / Weight / Eject Distance 20
8.2. Dimensions and Weight of Packing Box 21
8.3. Packaging Condition 21
9. Safety and Radiation **22**
9.1. Safety Regulation 22
9.2. Laser 22
9.3. EMC 22
10. Reliability **23**
10.1. MTBF 23
10.2. MTTR 23
10.3. Loading / Unloading Durability 23
10.4. Disc Attach / Detach 23
10.5. Interface Connector Attach / Detach 23
11. Change History **24**
12. Notes **25**

1. Blank Page

2. Features

Maximum Write Speed	**8X CAV at DVD-R/+R** **8X Z-CLV at DVD+RW** **6X P-CAV at DVD-R DL/+R DL** **6X Z-CLV at DVD-R DL/+R DL, DVD-RW,** **5X Z-CLV at DVD-RAM** **24X CAV at CD-R** **24X Z-CLV at CD-RW**
Maximum Read Speed	**8X CAV at DVD-ROM, DVD-R/+R/-RW/+RW, DVD-R DL/+R DL** **6X CAV at BD-ROM/-R/-R DL** **5X CAV at BD-R L to H/-RE/-RE DL** **5X Z-CLV at DVD-RAM** **24X CAV at CD-ROM/-R/-RW**
Buffer Memory Size	**4Mbyte**
ATA Interface	**Serial ATA Revision 2.6**
Data Transfer Mode	**Gen1i 1.5Gbits / sec**

12.7mm-Height Built in Type Drawer Loading Mechanism
Supports "Buffer Under Run" Protection (DVD and CD)
This product will obtain the certification of "Microsoft® Windows® Logo Program"(WHQL).
This product complies to RoHS Directive and WEEE Directive.

Disc Format supported	**BD-RE Ver2.1 (Read only)** **BD-R Ver1.1 & 1.2 & 1.3 (Read only)** **BD-ROM (with copy protection) and BD9** **KODAK Photo CD Single and Multi-session** **CD Extra (CD PLUS)** **Video CD** **CD text data (Read/Write)** **CD-R discs (Read/Write)** **CD-RW discs (Read/Write)** **DVD-R Ver.2.0 & 2.1 for General (Read/Write)** **DVD-R DL Ver.3.0 (Read/Write)** **DVD-RW Ver.1.0 & 1.1 & 1.2 (Read/Write)** **DVD+R Ver.1.3 (Read/Write)** **DVD+R DL Ver1.0 & 1.1 (Read/Write)** **DVD+RW Ver.1.3 & high speed Ver.1.0 (Read/Write)** **DVD-RAM Ver.2.0 & 2.1 & 2.2 (Read/Write: RAM2 Read only)**

3. Name of Parts / Function / Setting

3.1. Front

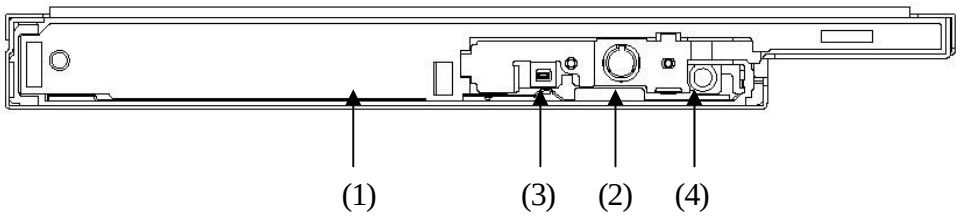


Figure 3-A: Front View

Disc Loading Tray (1)

Open the loading tray by pressing the eject button. And set a disc with the label facing up.
Push the front part of tray to load the tray with the disc.

Eject Button (2)

To unload the disc, press the button.

BUSY Indicator (3)

It is lit when the data on the disc is accessed.

Forced Eject Hole (4)

Insert a stiff rod into the hole and push to eject the tray when the tray doesn't unload by pressing the Eject button. In the normal operation, the eject button should be used to unload the tray. Make sure the power of the drive is turned off and wait more than one minute till the disc rotation is stopped when access the eject hole.

Notes: The drive corresponds to GBAS.
GBAS is "Generic Bezel Attachment Specification" by Dell Computer Corporation.
The figure 3-A as above is for Pioneer standard bezel and it is not attached to this drive when shipping.

3.2. Rear

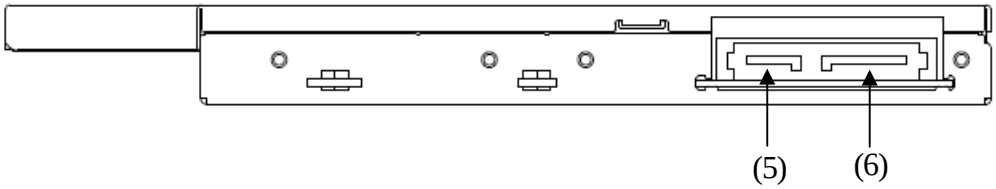


Figure 3-B: Rear View

DC Input (5)

Pin	Name	Function
1	DP	Device Present
2	+5V	5 V Power
3	+5V	5 V Power
4	MD	Manufacturing Diagnostic (Vendor unique)
5	GND	
6	GND	

SATA Interface (6)

Pin	Name	Function
1	GND	
2	A+	Differential Signal Pair from host controller
3	A-	
4	GND	
5	B-	Differential Signal Pair to host controller
6	B+	
7	GND	

4. Power Supply

4.1. Input Voltage

Normal DC Input Voltage	+5V
Voltage Allowance	+/- 5 % (Operating) - 8% (Start-up)
Ripple Voltage	Less than200 mVp-p

4.2. Current and Power Consumption

Conditions			+5V Current [mA]	Power Consumption [W]
Sleep (Average)		Sleep Command	75	0.38
Stand-by (Average)		Laser OFF, Motor OFF	75	0.38
Idle (Average)		Laser ON, Motor ON	570	2.85
Write (Average)	DVD	DVD-R/+R 8X Write	830	4.15
	CD	CD-R/RW 24X Write	880	4.40
Read (Average)	BD	BD-ROM 6X Read	900	4.50
	DVD	DVD-ROM 8X Read	800	4.00
	CD	CD-ROM 24X Read	740	3.70
Random Access		BD-ROM 100%	1,180	5.90
Maximum (Peak)		BD-ROM Full-stroke Seek	1,790	8.95

Note: The current is measured with current probe and applied 1 KHz LPF to reject high frequency spikes.

5. Installation

5.1. Mounting Direction

This drive is Horizontal and Vertical Use.
Allowance is referring to the following figures.

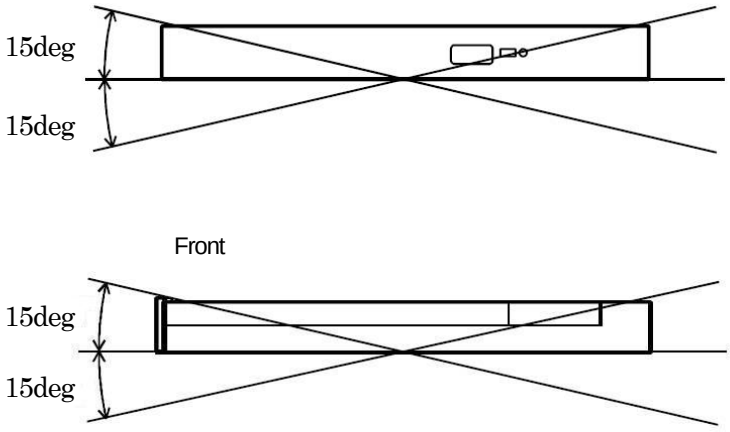


Figure 5-A: Mounting Direction, Horizontal

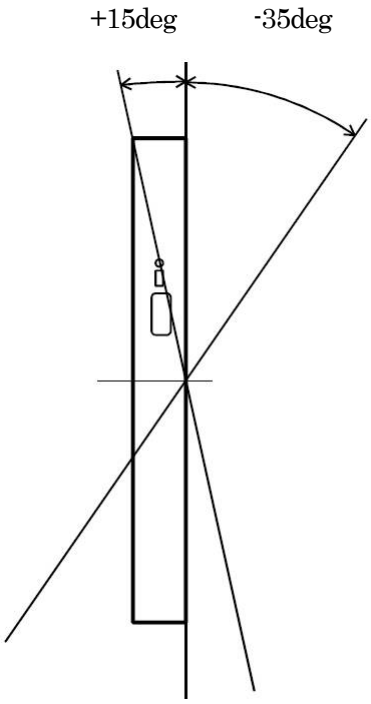
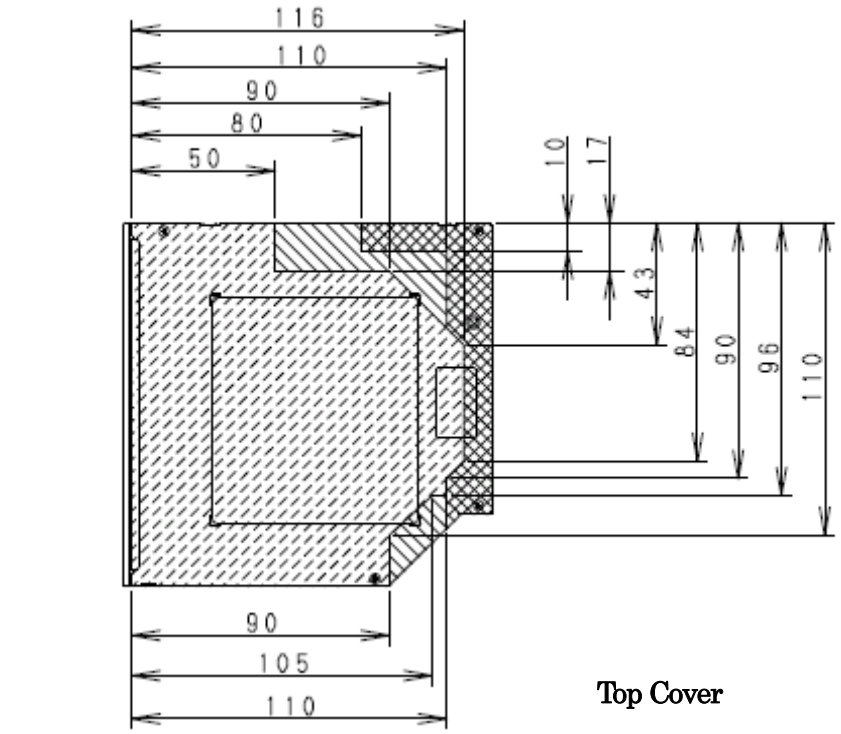
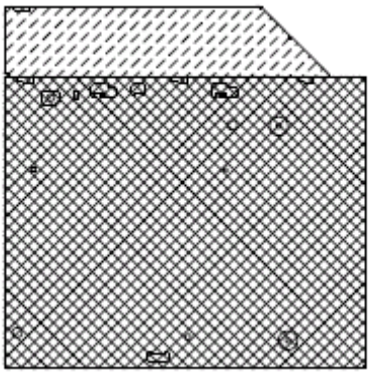


Figure 5-B: Mounting Direction, Vertical

5.2. Installation Conditions

Range of force for the top cover and the bottom case

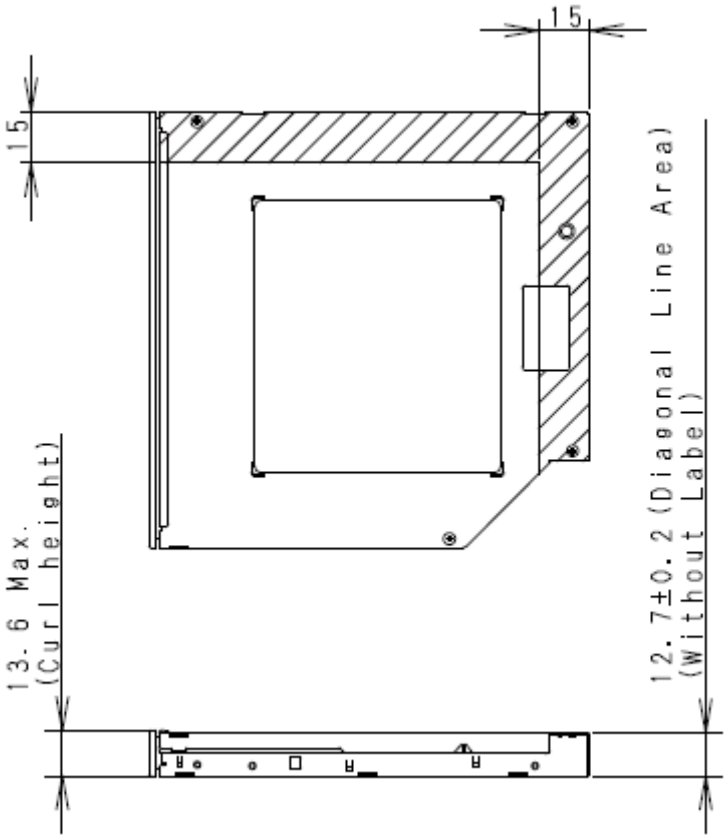




Area:Do not exert force over 2N on this area.
Area:Do not exert force over 1N on this area.
Area:Do not exert any force on this area.

Figure 5-C: Top Cover and Bottom Case Force Map

Drive Unit Clearance



Overall unit height of the diagonal area in the diagram above is 12.7+/-0.2 (excluding unit bottom shield sheet)
Other areas (excluding product label and top metal sheet curling) are 12.7+0.5/-0.2.
If force is exerted in areas outside of the range of force (see Range of force), problems may occur with the loading mechanism. It is recommended to secure >0.5 clearance (13.2 from the Z plane) between the unit and chassis.

Figure 5-D: Drive Unit Clearance

6. Environmental Conditions

6.1. Temperature and Humidity

Unit Condition	Test Items	MIN.	TYP.	MAX	Units	Note
Operating	Temperature	+5	-	+50	ºC	within 10 ºC/hour deviation
	Humidity	5	-	85	%RH	within 10 %/hour deviation
	Wet Bulb Temp.	-	-	29	ºC	No condensation
Not Operating	Temperature	-20	-	+60	ºC	within 10 ºC/hour deviation
	Humidity	5	-	90	%RH	within 10 %/hour deviation
	Wet Bulb Temp.	-	-	29	ºC	No condensation
Transportation (Packaging Condition)	Temperature	-40	-	+60	ºC	within 20 ºC/ hour deviation
	Humidity	5	-	90	%RH	within 20%/ hour deviation
	Wet Bulb Temp.	-	-	29	ºC	No condensation

6.2. Vibration

Unit Condition	Test Items	Test Condition	Criteria
Operating	Acceleration	2.45 m/s2 {0.25G} 0-P	No error is found during the operation after this test.
	Frequency	10 ~500 Hz	
	Sweeping Time	1 octave/minute	
	Testing Time	30 minutes/one direction (3 directions in total)	
Not Operating	Acceleration	14.7 m/s2 {1.5G} 0-P	No damage is found on the drive after this test
	Frequency	10 ~500 Hz	
	Sweeping Time	1 octave/minute	
	Testing Time	30 minutes/one direction (3 directions in total)	
Transportation (Packaging Condition)	X-direction	5-50Hz , 6.86 m/s2 {0.7G} , 15 minutes	The drive works normally after each cycle test.
	Y-direction	5-50Hz , 6.86 m/s2 {0.7G}, 15 minutes	
	Z-direction	5-30Hz , 10.78 m/s2 {1.1G}, 75 minutes 30-50Hz , 6.86 m/s2 {0.7G}, 75 minutes	

6.3. Shock

Drive Condition	Test Item	Test Condition	Criteria
Operating	Acceleration	19.6 m/s2 {2 G} 0-P during read and play 14.7 m/s2 {1.5G} 0-P during write operation	No error is found during the operation after this test.
	Pulse	11 msec (half-sine)	
	Number of Pulse	10 pulse x 10sec interval x 3 directions	
Not Operating <Half-sine>	Acceleration	2058 m/s2 {210 G}	No damage is found on the drive after this test
	Pulse	3 msec	
	Number of Pulse	1 pulse (in 3 directions)	
Not Operating <Square Wave>	Acceleration	980 m/s2 {100 G}	No damage is found on the drive after this test
	Pulse	180 inch/sec	
	Number of Pulse	1 pulse (in 3 directions)	
Transportation (Packaging Condition)	Height	80 cm	The test is done with packaging condition. The drive works normally after this test.
	Direction	1 corner, 3 edges, 6 faces	

6.4. ESD (Electro Static Discharge Susceptibility)

Drive Condition	Test Item	Test Condition	Criteria
Operating	Voltage	+/- 4 kV (contact) +/- 10 kV (in air)	Standard: IEC61000-4-2 No drive error.
	Charge Capacitor	150 pF	
	Discharge Resistor	330 ohm	
Non-Operating	Voltage	+/-8 kV (contact) +/- 15kV (in air)	Standard: IEC61000-4-2 No hardware damage.
	Charge Capacitor	150 pF	
	Discharge Resistor	330 ohm	

6.5. Altitude

Drive Condition	MIN.	TYP.	MAX.	Units	Note
Operating	0	-	3,500	m	
Non Operating	0	-	13,600	m	

7. Specifications

7.1. Disc Format

DISC Format	Write	Read
BD-ROM Ver.1.3(Single Layer, Dual Layer)	N/A	Y
BD-ROM(BD9)	N/A	Y
BD-RE Ver.2.1(Single Layer)	N/A	Y
BD-RE Ver.2.1(Dual Layer)	N/A	Y
BD-R Ver.1.1, 1.2 and 1.3(Single Layer)	N/A	Y
BD-R Ver.1.1, 1.2 and 1.3(Dual Layer)	N/A	Y
BD-R L to H Ver.1.2 and 1.3	N/A	Y
DVD (DVD-5; Single layer, Single side 4.7Gbytes)	N/A	Y
DVD (DVD-9; Dual layer, Single side 8.54Gbytes)	N/A	Y
DVD (DVD-10; Single layer, Dual side 9.4Gbytes)	N/A	Y
DVD (DVD-18; Dual layer, Dual side 17.09Gbytes)	N/A	Y
DVD-R Ver.1.0 (for authoring 3.95Gbytes)	N	Y
DVD-R Ver.2.0 (for authoring 4.7Gbytes)	N	Y
DVD-R Ver.2.0 and 2.1(for general 4.7Gbytes)	Y	Y
DVD-R DL (Dual Layer) Ver.3.0 (8.54Gbytes)	Y(*1)	Y
DVD-RW Ver.1.0, 1.1, and 1.2 (4.7Gbytes)	Y	Y
DVD+R Ver.1.3	Y	Y
DVD+R DL (Double Layer) Ver.1.0 and 1.1(8.54Gbytes)	Y(*1)	Y
DVD+RW Ver.1.3	Y	Y
DVD+RW high speed Ver.1.0	Y	Y
DVD-RAM Ver.1.0	N	N
DVD-RAM Ver.2.0, 2.1 and 2.2 (Class0)	Y	Y
DVD-RAM Ver.2.2 [RAM2(Class1)]	N	Y
CD-ROM Mode1	N/A	Y
CD-ROM XA Mode2 (form1, form2)	N/A	Y
Photo CD (single and multiple session)	Y(*1)	Y
Video CD	Y(*1)	Y
CD-DA	Y(*1)	Y
CD-Extra	Y(*1)	Y
Mixed-CD	Y(*1)	Y
CD-Text	Y(*1)	Y
CD-R	Y	Y
CD-RW (Supports AM2)	Y	Y
HS CD-RW (Supports AM2)	Y	Y
US CD-RW (Supports AM2)	Y	Y
US+ CD-RW (Supports AM2)	Y	Y

Note:

(*1) Recording Software's support is required.

7.2. Read Speed

DISC Format	Transfer Speed (at Maximum)
BD-ROM (Single layer, Dual layer)	6X CAV
BD-R (Single layer, Dual layer)	6X CAV
BD-R (L to H)	5X CAV
BD-RE (Single layer, Dual layer)	5X CAV
DVD-ROM (Single layer)	8X CAV
DVD-ROM (Dual layer: Include BD9)	8X CAV
DVD-R/RW	8X CAV
DVD-R DL (Dual Layer) / +R DL (Double Layer)	8X CAV
DVD+R/RW	8X CAV
DVD-RAM	5X Z-CLV
DVD-Video (Single layer)	2X CLV
DVD-Video (Dual layer)	2X CLV
8cm DVD-ROM, DVD-R/RW	5.5X CAV
8cm DVD-Video	2X CLV
CD-ROM	24X CAV
Video CD	9.6X CAV
CD-DA, CD-TEXT, Mixed-CD,CD-Extra (Play audio)	9.6X CAV
CD-DA,CD-TEXT, Mixed-CD,CD-Extra (Data extraction)	24X CAV
CD-R	24X CAV
CD-RW	24X CAV
8cm CD-ROM, CD-R/RW	16X CAV
8cm CD-DA (Play audio)	6.6X CAV

Note: Rotation speed will go down automatically and read retry is performed if uncorrectable read error is detected at a normal reading speed.
At worst case, it is down 1X CLV at BD or DVD reading, 4XCLV at CD reading.

7.3. Write Speed

Media Type	Transfer Speed
DVD-R	1X CLV
	2X CLV
	4X Z-CLV
	6X Z-CLV
	8X Z-CLV
	8X CAV
DVD-R DL (Dual Layer)	2X CLV
	4X Z-CLV
	6X P-CAV
	6X Z-CLV
DVD-RW	1X CLV
	2X CLV
	4X Z-CLV
	6X Z-CLV
8cm DVD-R/RW	1X CLV
	2X CLV
DVD+R	2.4X CLV
	4X Z-CLV
	6X Z-CLV
	8X Z-CLV
	8X CAV
DVD+R DL (Double Layer)	2.4X CLV
	4X Z-CLV
	6X P-CAV
	6X Z-CLV
DVD+RW	2.4X CLV
	3.3X CLV
	4X Z-CLV
	6X Z-CLV
	8X Z-CLV
8cm DVD+R/RW	2.4X CLV
DVD-RAM	2X CLV
	3X CLV
	5X Z-CLV

CD-R		4X CLV
		10X-CLV
		16X Z-CLV
		24X Z-CLV
		24X CAV
CD-RW	Multi Speed	4X CLV
	High Speed	4X CLV
		10X CLV
	Ultra Speed Ultra Speed+	10X CLV
		16X Z-CLV
		24X Z-CLV
8cm CD-R		4X CLV
		10X CLV
8cm Multi Speed CD-RW		4X CLV
8cm High Speed CD-RW		4X CLV
		10X CLV
8cm Ultra Speed CD-RW		4X CLV
		10X CLV

7.4. Applicable Write Format

DVD-R	Disc at Once Incremental Recording (Multi-Border Recording)
DVD-RW	Restricted Overwriting Disc at Once Incremental Recording (Multi-Border Recording)
DVD+R	Sequential Recording (Multi-Session Recording)
DVD+RW	Random Recording
DVD-RAM	Random Recording
CD-R and CD-RW	Disc at Once Track at Once Session at Once Packet Recording (Multi-Session Recording)

7.5. Disc Size Diameter

ϕ120mm / ϕ80mm

* The drive does not support Non-Standard discs such as Shaped or Biz Card size discs.
* The drive does not support 8cm disc adapter.

7.6. Sustained Data Transfer Rate (Theoretical value)

Data Read

Parameter		Inner	Ave.	Outer	Unit	Note
Sustained	BD	11,340	-	27,000	Kbytes/sec	2.5X - 6X CAV mode over32 Block Transfer
	DVD	4,455	-	10,800		3.3X-8X CAV mode over16 Block Transfer
	DVD-RAM	4,155	-	6,925		3X-5X Z-CLV mode over16 Block Transfer
	CD	1,545	-	3,600		10.3-24X CAV mode over16 Block Transfer

Note: The value of "DVD" is specified when DVD-ROM Single Layer Disc is used.
The value of "BD" is specified when BD-ROM Single Layer Disc is used.

Data Write

Parameter		Inner	Ave.	Outer	Unit	Note
Sustained	DVD	4,455	-	10,800	Kbytes/sec	8X CAV DVD-R/+R write
	DVD-RAM	4,155	-	6,925		3X-5X Z-CLV write
	CD	1,545	-	3,600		24X CAV CD-R write

Note: The drive automatically slow down disc rotation speed to ensure data reading when imbalanced, warped or scratched disc is read. At this time, data transfer rate becomes lower than its specifications.
The transfer rate at CD-ROM is specified when 1.3m/s scanning velocity disc is played.

7.7. Buffer Memory Size

4 Mbytes

7.8. Access Time / Seek Time

Parameter		Ave.	Unit	Note
Access Time	BD	220	msec	Random Average
	DVD	200		
	DVD-RAM	230		
	CD	180		
Random Seek Time	BD	200	msec	Random Average
	DVD	180		
	DVD-RAM	210		
	CD	160		
Full Stroke Seek Time	BD	370	msec	Average
	DVD	330		
	DVD-RAM	390		
	CD	330		

Note: The value of "CD" is specified when CD-ROM Mode1 Disc is used.
The value of "DVD" is specified when DVD-ROM Single Layer Disc is used.

7.9. Initializing Time / Stating Time / Stop Time

Parameter		Spec (TYP.)	Note
Initializing Time	BD-ROM(S)	16 sec	The period between disc spin up and pause on the first address after TOC reading. Takes 4 more sec. for BCA disc.
	BD-ROM(D)	22 sec	
	BD-RE	22 sec	
	BD-R	14 sec	
	CD-ROM	14 sec	
	CD-R	20 sec	
	CD-RW	16 sec	
	DVD-ROM(S)	14 sec	
	DVD-ROM(D)	22 sec	
	DVD-R(S)	18 sec	
	DVD-RW	22 sec	
	+R(S)	18 sec	
	+RW	20 sec	
	DVD-RAM	40 sec	
Starting Time	BD, DVD, CD	4 sec	The period between spindle stop condition and pause on the track number one. (after initialization, in response to start command)
Stop Time	BD, DVD, CD	3 sec	The period between pause condition and spindle stop condition by stop command.

Note: The value of "CD" is specified when CD-ROM Mode1 Disc is used.
The value of "DVD" is specified when DVD-ROM Single Layer Disc is used.
The value of "BD" is specified when BD-ROM Single Layer Disc is used.

7.10. Acoustic

Item	Spec.(TYP.)	Note
Sound Pressure	Less than 40dB(A)	Without loading operation, at 1m horizontal setting, with 0.25 gcm imbalance disc at 5,160rpm. Sequential read and random seek operation.

8. Dimensions / Weight / Eject Distance / Packing

8.1. Dimensions / Weight / Eject Distance

Dimensions: W128mm x D127mm x H12.7mm
Net Weight: 165g (without Bezel)
Eject Distance for Auto Eject : > 7 mm

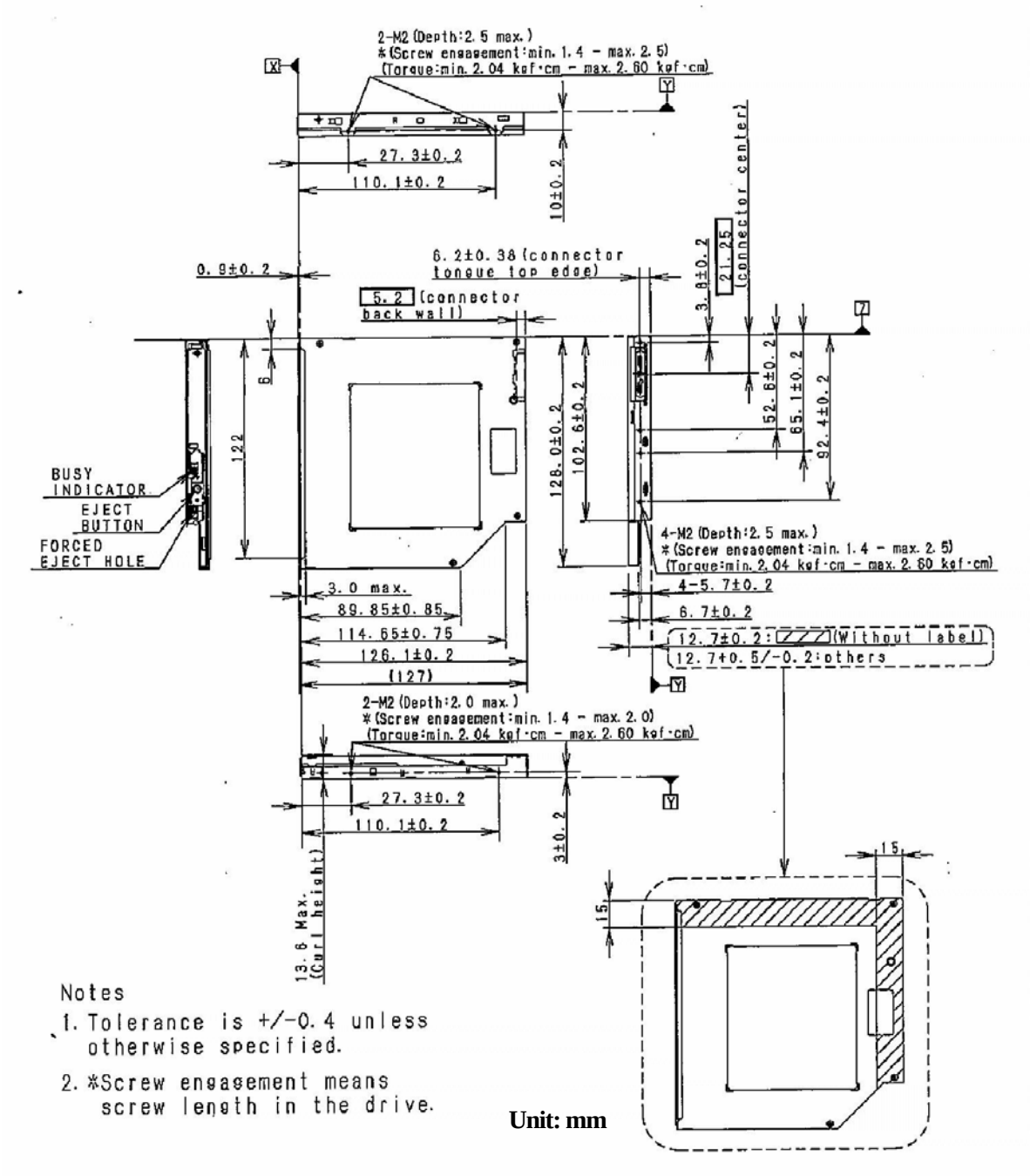
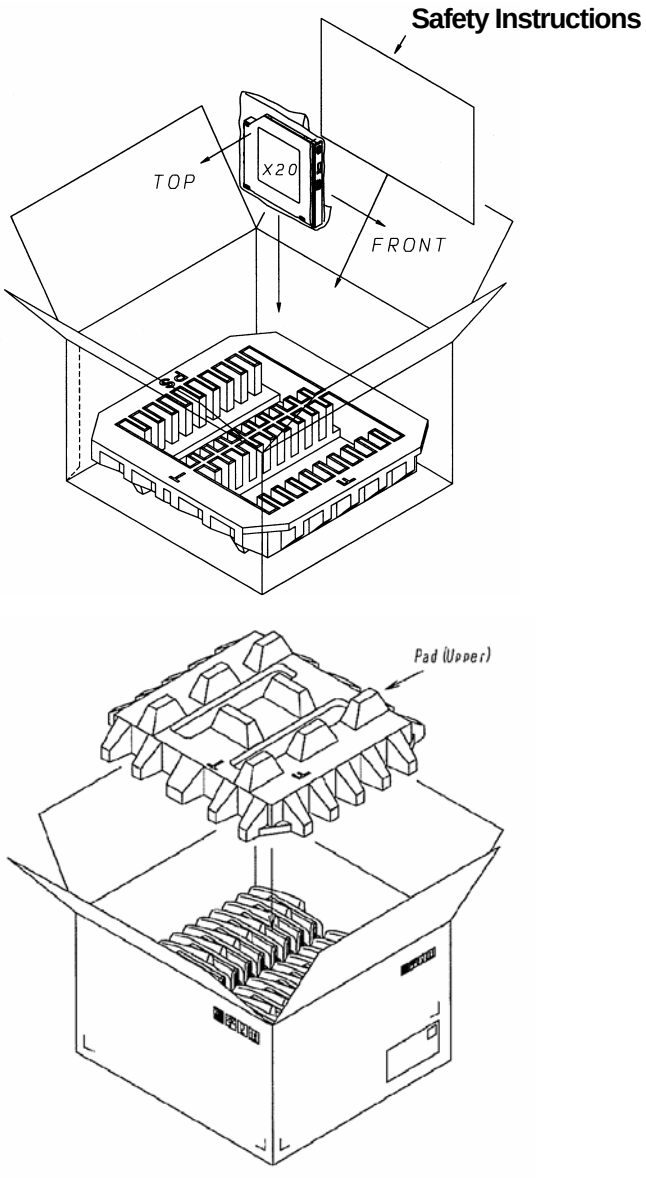


Figure 8-A: Drive Dimensions

8.2. Dimensions and Weight of Packing Box

(20pcs Bulk Packaging)
Dimensions: W 383mm x D 353mm x H 236mm
Gross Weight: 4.1kg

8.3. Packaging Condition



Condition: Bulk Package

Figure 8-B: Packaging Condition

9. Safety and Radiation

9.1. Safety Regulation

(UL)	UL60950-1 2nd Edition
(cUL)	CAN/CSA C22.2 No.60950-1-07 2nd Edition
(CB Report)	IEC 60950-1 : 2005
(TUV)	EN60950-1 2006
(FIMKO)	EN60950-1 2006

9.2. Laser

(IEC-LASER)	IEC60825-1 2007 Ed.2
(EN-LASER)	EN60825-1 2007
(FDA)	FDA 21CFR Sub chapter J, Laser Notice No.50

9.3. EMC

(IEC-EMC)	IEC CISPR22 2008 Ed.6.0
	IEC CISPR24 1997+A1 : 2001+A2 : 2002
(FCC)	FCC Part15B Class B
(ICES)	ICES-003 ClassB Issue 4 February 2004
(CE)	EN 55022 2006+A1 : 2007、EN 55024 : 1998+A1 : 2001+A2 : 2003
(BSMI)	CNS13438 2006
(C-Tick)	AS/NZS CISPR22 2009

10. Reliability

10.1. MTBF

(Mean Time Between Failure)
60,000 POH (duty: read 16% , write 4%)

10.2. MTTR

(Mean Time To Repair)
0.5 H

10.3. Loading / Unloading Durability

20,000 Times

10.4. Disc Attach / Detach

20,000 Times

10.5. Interface Connector Attach / Detach

500 Times

11. Change History

Rev.	Date	Page	Changes (Old -→ Revised)
0.50	2010/02/09	n/a	Initial Release

12. Notes

* Specifications and drawings are subject to change according to its improvement.
* Microsoft, Windows are trademarks of Microsoft Corporation.

SATA 12.7mm Height
BD-ROM, DVD/CD WRITER

BDC-TD03RS

PRODUCT SPECIFICATION

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PIONEER CORPORATION

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